The Use of Multiple Performance Measures Among the Balanced Scorecard Adopters and Non-adopters: Evidence from the Malaysian Manufacturers

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Abstract

The balanced scorecard (BSC) is one of the most popular performance management tools and has been used by many organizations worldwide today. The main purpose of this paper is to provide empirical evidence on whether or not there is a significant difference between the extent of use of multiple performance measures between the BSC adopters and non-adopters. From a sample of 120 Malaysian manufacturing firms, it was found that only 35 firms are actually adopting the BSC either wholly or partly while the rest are not adopting it at all. This paper reports that there are significant differences in the use of multiple performance measures relating to financial, customer, and internal processes such as operating income, return-on-investment (ROI), cash flows, number of customer complaints, and manufacturing lead time between BSC adopters and non-adopters. However, there is no significant difference in the use of performance measures relating to innovation and learning. Surprisingly, the results reveal that there is no significant difference in firm performance between the two groups. With regards to firm size, the size of BSC adopters is found to be larger than the non-adopters.

Field: Management Accounting

1. Introduction

With the growing discontent over the traditional management accounting and performance measurement systems (PMSs) and the increasing importance of multidimensional performance measures, many of the organizations worldwide have either implemented a new performance measurement system or modified their existing performance measurement system that meet the needs of today's business environment. Essentially, traditional performance measurement systems measure the performance of a business using financial accounting-based measures with short-term and backward-looking focus. Hence, traditional PMSs seem to ignore the non-financial performance measures which are important to measure

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the long-term value creation activities created from intangible assets. Managing and measuring long-term value creation activities are essential to any business organization as they could generate future growth to the organization.

Because of the arising need to improve the planning, control, and performance measurement systems, Kaplan and Norton introduced the BSC in the early 1990s. The BSC is a powerful tool for performance measurement and strategy execution and it has gained acceptance by many organizations worldwide today. A survey found that 50% of the Fortune 1,000 companies in North America and 40% to 45% of larger companies in Europe use the BSC (Brewer, 2002). Even though much has been written in the literature regarding the benefits of the BSC, few empirical studies have been conducted to establish the relationship between performance improvement and the adoption of a BSC.

To date, still little research has been published on performance measurement systems in the Malaysian context. There is not much information on the extent to which Malaysian organizations actually use performance measurement, particularly the BSC. In particular, there is still not much empirical evidence on whether an improvement in financial and non-financial performance will occur after implementing a BSC. Hence, the objectives of this study are to:

1) Examine the adoption level of the BSC by Malaysian manufacturing firms;
2) Determine whether there is a significant difference in the extent of use of performance measures between adopters and non-adopters of the BSC;
3) Determine whether there is a significant difference in firm performance between adopters and non-adopters of the BSC; and
4) Determine whether there is a significant difference in firm size between adopters and non-adopters of the BSC.

This paper is divided into four sections. The first section presents a brief literature review on the importance of multi-dimensional performance measures and the balanced scorecard framework which in turn lead to the hypotheses development. This is followed by the methodology sections explaining the sample and variable measurements. Third section provides the results of the survey. Finally, a section on the discussion of the findings is presented together with a conclusion.

2. Literature Review

2.1 Multi-dimensional Performance Measures

Financial measures are described as "lagging" measures as they focus on the past rather than future performance. They are unable to indicate to managers

what must be done to improve future performance. Therefore, managers should require a range of operational and leading measures that can drive performance throughout the organization. The integration of both financial and non-financial performance measures has been incorporated in the balanced scorecard framework proposed by Kaplan and Norton (1992, 1996). Inclusion of non-financial measures is actually an effort to reduce managerial bias towards financial measures in performance evaluation (Kaplan and Norton, 1992). The integrated performance measurement systems as proposed by Dixon et al. (1990) and Nanni et al. (1992), for example, also put more emphasis on non-financial measures, particularly relating to customers and internal processes.

The BSC framework focuses on four different perspectives of performance measures covering financial, customer, internal process, and learning and growth. According to Kaplan and Norton (2001), these four perspectives are linked together in a cause-and-effect relationship and help to translate strategy into objectives and measures. The cause-and-effect relationships in strategy maps can demonstrate how the intangible assets are transformed into tangible (financial) outcomes. The BSC not only translates the strategy to operational terms, but also aligns the organization to the strategy. The BSC plays its role as a measurement system as well as a management system. According to Gumbus and Lyons (2002), for example, the BSC has evolved from management reporting to a strategic tool used by managers to set strategy, align operations, and communicate with internal and external stakeholders. As a strategic tool, then a question comes out whether or not managers need some kind of weighting mechanisms by which to prioritize their daily actions since it is unlikely that all measures are equally important for driving strategy all of the time (Reisinger et al., 2003).

Several studies have been done in investigating how managers weigh and judge performance measures they used (Banker, Chang, and Pizzini, 2004; DeBush, Brown, and Killough, 2003; Dilla and Steinbart, 2005; Ittner, Larcker, and Meyer, 2003; Lipe and Salterio, 2000; Rich, 2007). Lipe and Salterio (2000), for example, found that common measures (financial or lagging measures) have more effect on unit's managers' decisions than the unique measures (non-financial or leading measures) in the performance evaluations. Later, Dilla and Steinbart (2005) found similar results, but showed a relatively greater emphasis on unique measures after using the BSC for some time. Meanwhile, Banker et al. (2004) found that irrespective of whether measures are common or unique measures, given detailed strategy information, managers rely more on strategically linked measures, even if they are unique, rather than on non-linked measures that are common. Further, a recent experimental study by Rich (2007) suggests that managers do not rate the importance of individual performance measures equally, and at the outset of the decision process, they often rely on simplifying strategies to help process the information in the time available.

According to Marr (2005), BSC is the most popular business performance measurement (BPM) approach today. He found that companies with a formal BPM approach placed more emphasis on their non-financial measures where only 5% stated that more than three-quarters of their measures are financial and only 21% reported that more than half of their measures are financial ones. In contrast, in companies without a formal BPM approach, 31 percent said that over three-quarters of their measures are financial and 64 percent said that over half of their measures are financial ones.

Despite suggestions that firms should emphasize on and put more weight to non-financial measures, Gosselin (2005) reported that financial measures are more frequently used by manufacturing firms in the sample of his study. Therefore, we may expect the same results would happen in the Malaysian manufacturing industries and the following hypothesis was set forth:

H1: Firms tend to use more extensively financial measures than non-financial measures.

Consistent with Marr's (2005) study and considering the comprehensive performance measures of the BSC is predominantly non-financial in nature, thus we may expect that the extent to which firms use non-financial measures will be higher in firms adopting the BSC than non-adopting firms. Therefore, this hypothesis was developed:

H2: Firms that have adopted a BSC use more extensively non-financial measures and less extensively financial measures than firms that have not adopted a BSC.

2.2 Performance Measures and Performance

Kaplan and Norton (1992, p. 78) stated that "a failure to convert operational performance, as measures in the scorecard, into improved financial performance, should send executives back to their drawing boards to rethink the company's strategy or its implementation plans." This suggests that the performance of a firm would increase with the use of a BSC. Moreover, Kaplan and Norton (2001) indicated that measuring customer, operational efficiency and learning and growth all contribute to the bottom line.

Marr (2005), in his survey on business performance measurement use in the USA, found that organizations that follow a formal business performance measurement methodology, such as BSC, to manage their corporate performance outperform the organizations without a formal methodology to manage corporate performance. He also found that there is a positive impact of business performance measurement on communication effectiveness, collaboration, and the extraction of valuable insights and decisions.

Furthermore, several companies in the profit and non-profit industries have reported improved performance in operational efficiency and profitability as a result of using the BSC (e. g. Green, Garrity, Gumbus, and Lyons, 2002; and Ahn, 2001). Similarly, Daly (1996, pg. 65) noted that "preliminary evidence from field research indicates that analysts who focused on non-financial issues have increased accuracy in their earning estimates and a strong correlation with growth expectations." Since the comprehensive performance measures of the BSC is predominantly non-financial in nature, thus Daly's findings finding bears out the argument that the BSC can be used to increase performance. In a similar vein, Caterpillar has proved that corporate restructuring and developing new performance measurement system focusing on financial and non-financial performance measures have encouraged the employees to make better decision, improved customer services and productivity and in turn impacted Caterpillar results favorably (Hendricks et al., 1996).

The empirical studies conducted by Hoque and James (2000), Malina and Selto (2001), Ittner et al. (2003), and Davis and Albright (2004) also examined the association between BSC usage and organizational performance. Hoque and James (2000) found that there is a significant positive relationship between the usage of BSC measures and performance among the Australian manufacturing firms. Malina and Selto (2001) conducted an intensive field study of a large manufacturing organization and found that perceived improved performance on the BSC would lead to improved efficiency and profitability. More recently, Davis and Albright (2004) investigated the implementation of the BSC in a banking institution. They provided evidence that the BSC can be used to improve financial performance. Their findings indicate that branches in the BSC group outperformed non-BSC branches on a common composite financial measure.

Meanwhile, a study by Banker et al. (2000) in a hotel chain has shown that there is a positive relationship between the use of non-financial measures (for example customer satisfaction) and financial performance. This study provides evidence that the implementation of a performance measurement system that includes non-financial measures, such as the BSC, can be associated with improved financial performance.

However, contradictory evidence to the above mentioned studies was provided by Ittner et al. (2003). Ittner and his friends studied financial service industry and found that there is a negative relationship between BSC usage and financial performance (ROA).

Following suggestions by Kaplan and Norton and findings from several previously mentioned studies, it is expected that firms that have adopted a BSC outperform the firms that have not adopted a BSC. Thus the following hypothesis was developed:

H3: Firms that have adopted a BSC outperform the firms without a BSC.

2.3 Firm Size and the Adoption of BSC

Organization size can have effects on the design of accounting systems and on budget characteristics (Merchant, 1981). Merchant (1981) noted that larger firms which are more diversed and decentralized tend to implement a more administratively-oriented control strategy and greater budgeting sophistication. In relation to the BSC, Hoque and James (2000) found that large size is positively associated with the overall usage of BSC measures. However, later, a study by Hoque, et al. (2001) indicates that business unit size appears not to be an important predictor of a performance measurement system (BSC) usage. More recently, Speckbacher et al. (2003) studied the impact of size on BSC and found that there is a significant association between size and BSC usage.

Blau and McKinley (1979) found that innovation was positively correlated with size. Since the BSC is considered as an important innovation in performance measurement and management systems, it is expected that BSC adopters tend to be large firms. However, there is need for BSC to be used by small and medium enterprises (SMEs) as well (Chow, Haddad, and Williamson, 1997; Gumbus and Lussier, 2006).

It is expected that firm size will differ between adopters and non-adopters of BSC where BSC tends to be adopted by larger firms than the smaller ones. An argument for this proposition is that larger firms are usually associated with more access to resources, economies of scale, and value chain alliances (Kettinger et al., 1994), thus its requirement for information in general and performance measures in particular would increase. Whereas, many smaller companies often do not have sufficient resources in terms of experienced staffs and budget to develop the BSC.

Hence, from the foregoing arguments, the following hypothesis was suggested:

H4: Firms that have adopted a BSC tend to be larger than firms that have not adopted a BSC.

3. Research Methodology

The population surveyed consisted of Malaysian manufacturing firms listed in the Federation of Malaysian Manufacturers (FMM) directory, year 2003. A sample of 975 firms was randomly drawn from this list. A mailed-questionnaire was used to gather the data. The questionnaire was directed to CEOs and managing directors where their names were extracted from the directory. The survey yielded a response rate of 12.3 percent with 120 usable responses. The questionnaire includes a list of 29 performance measures

comprising financial and non-financial measures commonly used by manufacturing organizations. Twenty items were taken from Hoque *et al.* (2001) which is originally adopted from Kaplan and Norton (1992). The remaining nine items were taken from several academic literatures. The extent of use of each performance measure was assessed on a seven-point likert scale ranging from not at all (1) to a greater extent (7). The assumption was made that all firms use some kinds of indicators to measure aspects of their performance and these measures were operationalized according to the BSC framework. A list of the performance measures (before factor analysis) used by all responding firms is presented in Table 1. The 29 performance measures were ranked according to the mean score of the extent to which firms use each of the performance measures.

4. Results

4.1 Profiles of Responding Firms

Majority of the firms come from four types of manufacturing activities. They are electrical and electronics product manufacturing (25); followed by iron, steel, and metal product manufacturing (18); food and beverage manufacturing (13); and rubber and plastic product manufacturing (11). The responding firms range from small and medium (29% of the sample firms have employees less than or equal to 150) to large (71% of the firms have employees greater than 150). In Malaysia, manufacturing firms with full-time employees not exceeding 150 are considered as small and medium enterprises (SMEs) as defined by Small and Medium Industries Development Corporation (SMIDEC). The firms with annual sales turnover greater than or equal to RM21 million is 82.3%. Majority of the firms have total gross asset less than or equal to RM50 million (52.6%), while those with total gross asset above RM150 million is 18.4%.

4.2 BSC Adoption

In the questionnaire, respondents had to indicate whether or not their firms adopt a BSC. As shown in Table 1, about 30.4% of the firms have adopted balanced scorecard as a performance measurement system either wholly (8.7%) or partially (21.7%). Of those that do not adopt BSC, 31.3% said that their firms intend to adopt it in the future while 12.2% said that their firms do not have the intention to do so. There were five firms that did not respond to this question. Surprisingly, quite a number of firms (26.1%) did not adopt BSC because they do not know what BSC is all about. The findings indicate that the adoption rate of BSC in Malaysia is lower than in the USA (44% found by Rigby, 2001 and 35% found by Marr, 2005), India (45% reported by Anand, Sahay, and Saha, 2005), and Australia (88% found by Chenhall and Smith, 1998). However, the adoption rate is much higher than in Germany, Switzerland, Austria (26% as reported by Speckbacher et al., 2003), and

Finland (22.5% as found by Malmi, 2001), while the similar rate was found in Canadian Manufacturing firms (Gosselin, 2005).

TABLE 1: BSC ADOPTERS AND NON-ADOPTERS

	Frequency	Valid Percent
Adoption of BSC:		
Yes, partially	25	21.7
Yes, wholly	10	8.7
No, but intend to use it in the future	36	31.3
No, and do not intend to use it in the future	14	12.2
Do not know	30	26.1
Total	115	

4.3 Extent of Use of Performance Measures

As shown in Table 2, from the top six performance measures, five of them are financial. These measures are: sales revenue, operating income, sales growth, manufacturing costs, and cash flows. Except for on-time delivery which is ranked first, all the other non-financial measures are ranked seventh and below. These results indicate clearly that financial measures are still important and receive more weight in the performance measurement systems of Malaysian manufacturing firms despite the extensive literature favoring the use of non-financial measures. Therefore, overall, the results provide reasonable support for *H1*.

Since this study is exploratory in nature, the 29 performance measures were factorized with varimax rotation to determine whether there were any patterns among the 29 measures that were similar to the BSC's four perspectives. After several runs of factor analysis, there were only 17 measures left eventually and a total of 12 items were deleted from the analysis due to cross-loadings and insignificant factor loadings. This procedure finally identified five factors with eigenvalues greater than 1 that explained a total of 71.9% of the variance. Table 3 presents the factor loading for each of the performance measure.

The first factor was labeled product-focused customer. It consists of four measures related to percentage of shipments returned, number of overdue deliveries, number of warranty claims, and number of customer complaints. The second factor includes four measures pertaining to manufacturing lead time or cycle time, ratio of good output to total output, labour efficiency variance, and flexibility. Thus, it was named internal processes. The third factor was labeled innovation as it is composed of three measures relating to time-to-market new products, number of new product launches, and number of new patents. Factor 4 is made of a group of measures that are typically financial. There are three measures under this factor: sales revenue, sales

growth, and operating income. Factor 5 is a group of measures relating to on-time delivery, customer response time, and survey of customer satisfaction. Thus, this factor was labeled time-focused customer.

TABLE 2: PERFORMANCE MEASURES

	Mean	Standard Deviation
On-time delivery	5.9916	.9957
Sales Revenue	5.9833	.9165
Operating income	5.9832	1.0575
Sales growth	5.9583	.8925
Manufacturing costs	5.8167	1.1226
Cash flows	5.7203	1.2187
Customer response time	5.6639	1.0991
Number of customer complaints	5.6186	1.5901
Survey of customer satisfaction	5.5250	1.1447
Manufacturing lead time/cycle time	5.5085	1.3381
Defect rate	5.5043	1.6275
Employee training	5.4833	1.1226
Market share	5.4746	1.2034
Ratio of good output to total output	5.4576	1.3815
ROI	5.4250	1.1858
Materials efficiency variance	5.3898	1.5137
Labour efficiency variance	5.3729	1.3700
Customer loyalty	5.3667	1.4019
Rate of material scrap loss	5.3559	1.6147
Employee satisfaction	5.0167	1.4022
Setup and changeover time	4.9915	1.4354
Number of overdue deliveries	4.9912	1.6590
EVA	4.9492	1.4313
% of shipments returned	4.8750	1.9210
Flexibility	4.8448	1.4542
Number of warranty claims	4.6639	1.9799
Number of new product lunches	4.2288	1.8277
Time-to-market new products	4.1849	1.7465
Number of new patents	3.5462	1.8354

4.4 BSC Adopters vs Non-adoptesr

To test *H2*, an analysis of the means of each 29 performance measures was performed. The responding firms were divided into two groups: adopters and non-adopters of the BSC. For the purpose of the analysis, 35 firms that adopt BSC either wholly or partly are considered as adopters, while 80 firms are

considered as non-adopters. Table 4 presents the results of the comparison of the group means using the independent sample T-test.

As shown in Table 4, only 11 performance measures that were significantly different between adopters and non-adopters of BSC. Six of the measures are typically financial. They are operating income, ROI, cash flows, manufacturing costs, EVA, and materials efficiency

TABLE 3: FACTOR LOADINGS

Performance Measures	Factors				
	1	2	3	4	5
% of shipments returned	**.840**	.210	.041	.125	.067
Number of overdue deliveries	**.839**	.110	.066	.154	.183
Number of warranty claims	**.817**	.059	.241	-.100	.086
Number of customer complaints	**.777**	.278	-.043	.167	.219
Manufacturing lead time/cycle time	.171	**.836**	.101	.118	.146
Ratio of good output to total output	.042	**.830**	.083	.096	.202
Labour efficiency variance	.314	**.659**	.164	.198	.176
Flexibility	.244	**.540**	.324	-.042	.176
Time-to-market new products	.012	.186	**.875**	-.097	.064
Number of new product launches	.187	.063	**.849**	.112	.082
Number of new patents	.038	.158	**.815**	.019	.107
Sales revenue	.031	.139	-.003	**.910**	.021
Sales growth	.005	.039	.169	**.840**	.183
Operating income	.269	.112	-.156	**.640**	.096
On-time delivery	.192	.232	.014	.102	**.840**
Customer response time	.110	.040	.151	.234	**.811**
Survey of customer satisfaction	.150	.245	.114	-.008	**.654**
Eigenvalues	5.58	2.24	1.84	1.42	1.15
% of variance explained	17.95	14.53	14.44	12.77	12.20

variance. The remaining five measures are essentially non-financial that are commonly used to measure customer (number of warranty claims, survey of customer satisfaction, and percentage of shipments returned) and internal processes (manufacturing lead time/cycle time and rate of material scrap loss). The six financial measures that were significant represent about 67% of the total nine financial measures, while the five non-financial measures that were significant represent only 25% of the total 20 non-financial measures. Thus, the results cannot confirm that the BSC adopters use non-financial measures to a larger extent and use financial measures to a lesser extent compared to the non-adopters. Instead, the results show that financial measures are used to a larger extent by the BSC adopters than do the non-adopters. Other than the five non-financial measures, on average, albeit the differences are not significant, the adopters of BSC in the sample use non-financial measures more extensively than do the non-adopters as shown by the mean scores.

TABLE 4: PERFORMANCE MEASURES – T-TEST FOR GROUP MEANS COMPARISON

Performance Measures	Mean		*p*-value
	Adopters	Non-adopters	
Operating income	6.3235	5.8250	0.022
ROI	6.1429	5.8750	0.024
Cash flows	6,1212	5.5750	0.030
Manufacturing costs	6.1143	5.7125	0.073
EVA	5.2941	4.7722	0.080
Number of warranty claims	5.2857	4.4937	0.031
Survey of customer satisfaction	5.8571	5.4125	0.034
% of shipments returned	5.5143	4.7250	0.016
Materials efficiency variance	5.8529	5.2785	0.056
Manufacturing lead time/cycle time	5.8824	5.3671	0.060
Rate of material scrap loss	5.8235	5.2532	0.073

***Note**: The table includes only the measures for which there was a significant difference in the means*

TABLE 5: FIRM SIZE - T-TEST FOR GROUP MEANS COMPARISON

	Mean		*p*-value
	Adopters	Non-adopters	
Number of employees	540.4194 (5.7144)*	303.0921 (5.3309)*	0.046

** Values in brackets are when number of employees measuring firm size was transformed logarithmically.*

To test *H3*, an analysis of the means of each performance indicators was performed for both adopters and non-adopters of BSC. However, the results reveal that there is no significant different in each of performance indicators between the BSC adopters and non-adopters. Thus, *H3* was not supported. The results of this test are purposely not reported in this paper.

To test *H4,* comparison of group means of number of employees was carried out. Table 5 provides the results. Firm size was measured using number of employees obtained from the FMM directory. Firm size was then transformed logarithmically to adjust for expected non-linearity or non-normality (Gosselin, 1997). The results indicate that the firm size of BSC adopters and non-adopters are significantly different. Number of employees score for the adopters (mean = 5.7144) is significantly higher than the non-adopters (mean = 5.3309). Hence, *H4* was supported.

5. Discussions, Implications, and Limitations

Hypothesis 1 was confirmed from the results of this study. Despite the importance of non-financial measures highlighted in the literature, this study provides additional evidence that financial measures are used more extensively by manufacturing firms than non-financial measures. This study confirms many previous studies (e. g. Gosselin, 2005; Lingle and Schiemann, 1996; Anand et al., 2005). Borrowing the explanation given by Rich (2007), the bias towards financial measures is mainly because they are more standardized measures which are common between business units. According to Lipe and Salterio (2000), managers have cognitive difficulties working with measures to evaluate performance that are specific to a situation (unique measures) and therefore, prefer measures that are the same for different situations (common measures). Unique measures are essentially non-financial measures while common measures are essentially financial measures.

Hypothesis 2 was not confirmed from the results of means comparison between adopters and non-adopters of BSC. It seems that majority of performance measures in the financial category were used more extensively by adopters of BSC and less extensively by non-adopters of BSC. In contrast, only a few non-financial measures were used more extensively by adopters of BSC and less extensively by non-adopters of BSC. The findings are quite consistent with what Gosselin (2005) found in his study. As suggested by Rich (2007), the results imply that the BSC could be failing on its intention to reduce bias towards financial measures. Even though there are only a few non-financial measures being used more extensively by BSC adopter than non-adopters, the results indicate that adopters of BSC do put relatively more emphasis on non-financial measures. It shows that the BSC adopters do incorporate a set of non-financial measures into their performance measurement system. One possible explanation for the result that only a few non-financial measures were significantly different between the two groups

could be due to the fact that the adoption of BSC was still at the early stage for many Malaysian firms at that time and it was not as popular as it is now. Thus, these findings imply that more reliance on the financial (or common) measures and less reliance on the non-financial (or unique) measures is attributable to the adopters having little experience of the BSC. It is expected that this reliance would diminish with experience.

The results of this study also find no evidence to support *H3*. This study reveals that the performance of BSC adopters and non-adopters is not significantly different. Thus, this study is not able to support the assertion that the BSC adopters should outperform those non-adopters. The findings are not consistent with similar study in banking industry (Davis and Albright, 2004) that reveal superior financial performance for branches implementing the BSC when compared to non-BSC implementing branches. This is much consistent with Gosselin's (2005) argument that a few empirical studies conducted during the 1990s have not really been able to test the impact of the BSC on performance. A significant improvement in performance indicators is not shown as a result of adopting BSC. This outcome could be due to the fact that BSC is rather new to some Malaysian manufacturing firms and many of those firms that adopt it are still at the development stage or initial stage of implementation. Perhaps, these firms did not get much acceptance, involvement, and commitment from all the employees when all these are important for successful development and implementation of BSC. It could be also that the BSC adopting firms failed to incorporate a set of non-financial measures into the BSC in a logical and systematic manner thereby lead to the lack of a coherent linkage between the measures chosen and the targeted performance (Davis and Albright). Another important issue is that it is important for performance measurement to be tied eventually to compensation so that the correct employee attitude will be acquired and BSC will be successfully implemented. In addition, successful implementation of BSC and benefits gained from it depends also on how BSC is applied (Malmi, 2001).

Further, this study finds support for *H4*. As expected, the size of the BSC adopting firms is much larger than the non-adopting firms. This explains that firm size is an important factor for implementing a BSC. This evidence is consistent with prior study by Hoque and James (2000) and Speckbacher et al. (2003) and other similar studies with respect to the effect of size on accounting and budgetary control practices (e.g. Merchant, 1981; Ezzamel, 1990). This result offers an explanation that as size increases, firms seem to be involved in more complex operations, thus the need for broader, comprehensive, multiple, and non-financial measures increases. Since the BSC is regarded as a significant innovation in performance measurement system, this finding in one way or another supports the arguments that adoption of innovation is associated with larger organization (Moch & Morse, 1977; Blau & McKinley, 1979). In addition, implementation of a BSC requires a great amount of resources. Therefore, only large firms with sufficient capital resources are able

to implement a BSC because according to Hicks (1997) and Finch (1986), size can be associated with capital resources.

The findings of this study produce at least three practical implications. First, despite extensive literature on the importance of non-financial performance measures in providing better indicators of performance, many Malaysian manufacturers still use traditional financial measures to a larger extent. Nevertheless, the use of non-financial performance measures is gaining its momentum particularly for measures relating to customers and internal processes. Second, the adoption of a BSC is influenced by size of firms. As implementation of a BSC requires a great amount of capital resources and expertise, only larger firms would be able to adopt it. Third, firm size is an important contextual variable that may affect the design and characteristic of performance measurement system, such as BSC.

It is worth to note that this study is not free from inherent limitations. The main limitation is concerning the use of cross sectional data. Using cross sectional data would not allow us to observe the effects of emphasizing non-financial measures on financial performance. In relation to this, Kaplan and Norton (1992, p. 71) argued that non-financial measures such as customer satisfaction, internal process improvements, and an organization's innovation and improvement activities reflect the effect of current managerial actions that will not show up in financial performance until later. This limitation serves as an explanation for the findings in this study. Another limitation is the deliberate omission of contextual variables such as strategy and reward systems. This study ignores the strategy in assessing the use of performance measures. For a BSC to succeed, performance measures should be linked to strategy because not all measures are equally important for driving strategy all of the time (Reinsinger et al., 2003). Further research is needed to examine how the benefits of the BSC are affected by types of strategy. Also, this study ignores to link the BSC measures to a compensation system. Tying compensation to scorecard measures would provide more incentive for managers and employees to successfully implement a BSC and build organizational commitment to its strategic objectives. In fact, according to Rich (2007), managers do not equally weight performance measures when making comparative bonus allocation decisions. In relation to this, Atkinson and Epstein (2000) argued that as the BSC affects rewards, managers must take into account not only organizational structure and systems when implementing the balanced scorecard; but they must also consider their organization's history, management style, and culture.

Finally, the study covers only manufacturing industries. Therefore, any generalization of the results to other industries requires caution. Future studies could be conducted within service industries or public sector organizations so that more understanding on the use of multiple performance measures, in particular the BSC, in different settings could be gathered in order to explore how the benefits of the BSC are influenced by different types of industry.

In summary, this study provides additional empirical evidence on the application of the BSC as a performance measurement tool. Despite the popularity of BSC as a performance measurement and management tool has been extensively highlighted, the adoption of this tool is still low in Malaysia. Surprisingly, quite a number of firms do not adopt BSC because they do not know what BSC is all about. In fact, many firms still rely on financial measures and use them more extensively as compared to non-financial measures.

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